

1.0 Project Description, and Purpose and Need

1.1 Introduction

U.S. Route 54 (Route 54) is a major arterial crossing Missouri in a northeast to southwest fashion. It varies in section from a two-lane rural highway to a four-lane divided highway to a multi-lane urban arterial. It begins in the east at the Mississippi River at Louisiana, Missouri in Pike County and ends in the west at the Kansas state line west of Nevada, Missouri in Vernon County. Municipalities along its length include Louisiana, Bowling Green, Mexico, Auxvasse, Kingdom City, Fulton, Jefferson City, Eldon, Lake Ozark, Osage Beach, Camdenton, Hermitage, El Dorado Springs, and Nevada.

In the vicinity of the Lake of the Ozarks, Route 54 varies from a four-lane divided highway to a multi-lane urban arterial. From the Osage River to Business Route 54 (Business 54), Route 54 is both a two-lane highway and a four-lane divided highway. At Business 54, Route 54 transitions to a multi-lane urban arterial with a center bi-directional turn lane, which continues to south of Route KK where it then transitions back to a four-lane divided highway to east of Camdenton. Through the communities of Lake Ozark and Osage Beach, numerous driveways and local roads intersect Route 54.

Even though Route 54 is designated as an east-west route across the state, it is characterized more as a north-south route in the vicinity of the Lake of the Ozarks. For this study, directional references pertaining to Route 54 are designated in a north-south direction.

1.2 Project History

The Missouri Department of Transportation (MoDOT) has been developing a program of improvements to Route 54 at the Lake of the Ozarks since the early 1980s. The primary purpose for these improvements is to relieve traffic congestion along existing Route 54. In the early 1980s, MoDOT divided Route 54 into four design segments for the purposes of managing engineering and construction of a new expressway through the Lake of the Ozarks region. Beginning in the north, the segments are (Figure 1-1):

- J5P0649: From the northern Business 54 intersection in Lakeland to the southern Business 54 intersection in Lake Ozark;
- J5P0781: From the southern Business 54 intersection in Lake Ozark to a point approximately ½ mile south of Route 42 in Osage Beach;
- J5P0309B: From a point approximately ½ mile south of Route 42 in Osage Beach to the Grand Glaize Bridge over the Lake of the Ozarks; and
- J5P0347: From the Grand Glaize Bridge to the south corporate limit of Osage Beach.

This Final Environmental Assessment (EA) covers only segment J5P0781.

The following discussion refers to the environmental documentation process that has occurred for the segments of Route 54 between the southern Business 54 intersection to the Grand Glaize Bridge (Segments J5P0781 and J5P0309B). The southern Business 54 intersection is subsequently referred to as Business 54.

A Draft Environmental Impact Statement (DEIS) was approved on May 17, 1985 by MoDOT and the Federal Highway Administration (FHWA) for the 2.5-mile long portion of Route 54 from the junction of Route 42 to the Grand Glaize Bridge (Segment J5P0309B). In the Purpose and Need

of the 1985 DEIS, the primary project purpose was to relieve traffic congestion along existing Route 54 by removing through traffic from the existing route by constructing a new highway on new alignment. Additionally, the Purpose and Need stated that the proposed 2.5-mile section would tie into the new two-lane Grand Glaize Bridge on the south and a half-diamond interchange near Route 42 on the north. The Purpose and Need also stated that the project between Route 42 and the Grand Glaize Bridge was part of a plan of improvement extending from Business 54 to the Grand Glaize Bridge. In the 1985 DEIS, there is no mention of logical termini or the independent utility of the project. The half-diamond interchange at the northern limit of the project was to be expanded to a full-diamond interchange at some point in the future. Additionally, no Section 4(f) evaluation was conducted for the 1985 DEIS even though the proposed action clipped a portion of Lake of the Ozarks State Park. The 1985 DEIS never went to a final version.

Subsequent to the May 1985 DEIS, an EA was approved in August 1985 for the expansion of existing Route 54 from two lanes to five lanes from Business 54 to the Grand Glaize Bridge. The Purpose and Need in that EA focused on the relief of congestion along existing Route 54 with better access to the adjacent businesses.

In 1990, a public hearing was held to present the proposed new expressway project (identified in the May 1985 DEIS) and the two-lane to five-lane widening (identified in the August 1985 EA). At that hearing, the public overwhelmingly supported the lane widening project and requested that it be done first before any construction for a new expressway was to begin. The primary concern of the public was better access and the increasing traffic congestion along existing Route 54. This lane widening took place in the early 1990s (see below).

The 1985 DEIS was updated with an Environmental Reevaluation (ER) in April 1996 by MoDOT and FHWA. The approval of this ER served as the “final” version of the 1985 DEIS. The ER included a Section 4(f) evaluation for Lake of the Ozarks State Park. As in the 1985 DEIS, the 1996 document did not discuss logical termini or independent utility of the proposed Route 54 project between Route 42 and the Grand Glaize Bridge. However, the ER did mention a reconnaissance report done in July 1988 for the portion of Route 54 between Business 54 and Route 42 (MoDOT Job J5P0648). The ER indicated that the construction on a new route between Business 54 and Route 42 was planned from 2002 through 2007. Per the ER, the reconnaissance report from 1988 indicated a preferred alternative alignment between Business 54 and Route 42 to be west of existing Route 54 and tying into the northern terminus of the preferred alternative of the Route 54 project (Segment J5P0309B) between Route 42 and the Grand Glaize Bridge. The Missouri Highway and Transportation Commission approved this tentative location on August 5, 1988.

The following summarizes the recently completed improvements along Route 54 in the Lake of the Ozarks region.

- The replacement and closure of the old bridge over the Grand Glaize Arm of the Lake of the Ozarks completed in 1984;
- The widening of Route 54 from Business 54 to the Grand Glaize Bridge from a two-lane to a five-lane section in the 1990s;
- The widening of Route 54 from the Grand Glaize Bridge to Route KK from a two-lane to a five-lane section completed in late 1994 (MoDOT Job Number J5P0480);
- An additional parallel bridge over the Grand Glaize Branch of the Lake of the Ozarks completed in the mid 1990s and the removal of the old Grand Glaize Bridge (MoDOT Job Numbers J5P0481 and J5P0481B); and

- Widening to four lanes from the south corporate limit of Osage Beach to just south of Route Y including a new interchange to Route Y, completed in late 2001 (MoDOT Job Numbers J5P0347C, J5P0347D, and J5P0347F)

Additionally, MoDOT is developing right of way and design plans, or is constructing Route 54 in several other locations including (see Figure 1-1):

- From Lakeland to just north of Business 54, widening from two to four lanes including a new bridge over the Osage River is currently under construction (MoDOT Job Number J5P0649);
- From just south of Route 42 to the north end of the Grand Glaize Bridge, design of a new four-lane expressway on new alignment (MoDOT Job Numbers J5P0309B, J5P0309C and J5P0309D); and
- From the south end of the Grand Glaize Bridge to the south corporate limit of Osage Beach, design of a new four-lane expressway on new alignment (MoDOT Job Numbers J5P0347, J5P0347B, and J5P0347E).

There is no definitive timetable as to when these planned improvements will be completed due to the current budget shortfalls within MoDOT.

1.3 Logical Termini and Independent Utility

The proposed action has independent utility in that it will meet all aspects of the identified Purpose and Need without construction of any additional improvements to either the north or south of the project termini. Specifically, the logical termini for this project are (Figure 1-2):

- The Business 54 intersection with Route 54 in Lake Ozark (near the Baymont Inn); and
- A point approximately ½ mile south of the intersection of Route 42 and Route 54 at the northern terminus of MoDOT Project Number J5P0309B.

1.4 Purpose of Proposed Action

The proposed action is to provide for an improved north-south transportation system through the cities of Lake Ozark and Osage Beach along the Route 54 corridor at the Lake of the Ozarks (Figure 1-2). The proposed action identifies an improvement to Route 54 that utilizes and parallels the existing transportation corridor between the stated project termini. The project length is approximately 1.5 miles and is in MoDOT's Transportation Improvement Plan.

The purpose of the proposed action is to reduce congestion in the study area by increasing system capacity, to improve safety, and to provide continuity with established and planned design segments of Route 54 having similar designs. In addition, the proposed action will provide a transportation improvement that addresses existing and projected traffic demands within the cities of Lake Ozark and Osage Beach resulting from increasing commercial development (such as Prewitt Point) near the intersection of Route 42 and Route 54 in the project study area. Specifically, the proposed transportation improvements will:

- Serve increased commercial development throughout the study area by reducing congestion along the primary arterial facility (existing Route 54) and provide access to existing Route 54;
- Improve the safety of the roadway system in the project area by relieving congestion along existing Route 54; and
- Provide route continuity by connecting existing construction to the north (Job Number J5P0649) and the proposed improvements to the south (Job Number J5P0309B).

The proposed transportation improvements improve travel efficiency for through traffic along the new alignment, relieve congestion and improve traffic operations along existing Route 54, and improve system capacity in the project area. The northern terminus represents a tie-in to the existing four-lane divided expressway north of Lake Ozark (J5P0649). The southern terminus connects to a design segment of a new Route 54 Expressway, which is currently under design (J5P0309B). Given the establishment of logical termini, this project will meet its purpose and need even if no other improvements are made.

1.5 Need for Proposed Action

Commercial development has expanded rapidly along Route 54 throughout the Lake of the Ozarks region. Recent large commercial developments along Route 54 within the study area include Prewitt's Point at Routes 54 and 42 (a development including Lowe's home improvement store and Pier 1 retail store) and Staples office supply store at the northern limit of Camden County. The area around Prewitt's Point continues to develop, and more new commercial uses are expected to be in place by the end of 2004. Home Depot opened in 2003 and a new Target store is currently under construction. Additionally, there are other areas suitable for future commercial development along existing Route 54 near the southern end of the study area in the vicinity of Route 42. Commercial developments in the study area have been and will continue to be businesses that serve local and regional customers as well as seasonal or weekend travelers from outside of the study area. The increased traffic from these developments has added to the congestion in the project study area and has affected traffic flow on Route 54 as well.

As a result of the existing development, traffic volumes exceed the capacity of the existing roadway during periods of each day particularly during the summer months of the year when seasonal and weekend travelers arrive in the lake area. The "summer" months of peak travel generally occur from May to September but may also extend into April and October. Any additional development will further cause an increase in traffic volumes on Route 54, which will exacerbate the capacity problems.

1.5.1 System Capacity and Access

The operational characteristics of urban arterial streets are generally governed by the number of accesses along the arterial. The accesses can include signalized intersections, unsignalized intersections, and commercial and residential driveways. Signalized intersections have the greatest influence on the travel speeds on an urban arterial. However, as unsignalized accesses increase along an arterial, the amount of "friction" experienced by the driver also increases. This friction reduces a driver's level of comfort while driving along the arterial. As friction increases and driver comfort decreases, the travel speeds along the arterial tend to decrease.

The operation of an arterial is measured by computing a Level of Service (LOS). The LOS is defined in terms of average travel speed of all through vehicles on the arterial. As mentioned above, it is strongly influenced by the number of signals per mile and the average intersection control delay. LOS ranges from an "A", the best traffic operation, to an "F", the poorest. In heavily developed areas, such as in the vicinity of the Lake of the Ozarks, the minimum desired level of service is typically a level D. Abbreviated descriptions for each LOS are defined in Table 1-1.

Table 1-1. LOS Characteristics, Urban Arterials

LOS	Description	Average Travel Speeds (as % of free flow speed)
A	Vehicles are unimpeded in their ability to maneuver within the traffic stream. Stopped delay at signalized intersection is minimal.	90% or greater
B	Vehicles are reasonably unimpeded at over average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted. Stopped delays at signalized intersections are not bothersome. Drivers are subjected to minor tension.	70%
C	Stable operations. The ability to maneuver and change lanes in mid-block location is restricted. Longer queues at signals develop. Motorists will experience appreciable tension.	50%
D	Approaching unstable flow. Small increases in flow may cause substantial increases in delay. Delays at intersections may become excessive. Signalized intersections have high densities and contribute to delays.	40%
E	Unstable flow. Continuous backup on approaches to intersections. Motorists experience lack of maneuverability and significant tension.	33% or less
F	Operational failure. Signalized intersection timing progression breaks down. Motorists experience frustration and gridlock.	25% or less

Source: Transportation Research Board, *Highway Capacity Manual, Special Report 209, Chapter 11*, 2000 and MACTEC, 2003.

On streets where traffic is controlled by signals, the highway user is not so much concerned with attaining a high travel speed as avoiding lengthy stops or a succession of stops at intersection after intersection. Average stopped-time delay is the principal measure of effectiveness used in evaluating signalized intersections. Delay time is closely related to motorists' perceptions of quality of traffic flow. The LOS for each leg of an intersection is an indicator of a combination of factors that relate to the operation of traffic through the intersection or series of adjacent signalized intersections. Table 1-2 provides LOS for signalized intersections based on the average stopped delay per vehicle, in seconds.

Table 1-2. LOS Characteristics, Signalized Intersections

LOS	Stopped Delay Per Vehicle (seconds)
A	≤ 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	> 80.0

Source: Transportation Research Board, *Highway Capacity Manual, Special Report 209, Chapter 9*, 2000.

Motorists more willingly accept a higher degree of inconveniences and/or slower travel times if their trips are short rather than long, but are not satisfied with the type of operations that occur when the volume of traffic approaches the capacity of the facility. On arterial streets within the urban environment, average running speed varies only slightly with changes in traffic flow rate.

However, delay at signalized intersections may increase dramatically as flow rates approach capacity. Therefore, greater degrees of congestion at signalized intersections result in reduced overall travel speeds and higher travel times along the arterial.

According to "A Policy on Geometric Design of Highways and Streets," American Association of State Highway and Transportation Officials (AASHTO), 1994, guidelines and principles for acceptable degrees of congestion include:

1. The highway should be so designed that when it is carrying the design volume, traffic demand will not exceed the capacity of the facility even during short periods of time. Where traffic is controlled by signals at intersections, the relationship between delay and capacity may be extremely complex. It is possible to have unacceptably large delays and long queues where traffic demand approaches 75 to 85 percent of capacity (V/C 0.75 to 0.85).
2. Volumes per lane should not exceed the rate at which traffic can dissipate from a standing queue. Cars dissipate at an estimated rate of 1,500 to 1,800 passenger cars per hour

The LOS on existing Route 54 has been computed for the "worst case" level for the peak traffic flow in the study area. That is, the traffic flow that would occur during the summer months *and* from Friday afternoon to Sunday evening. Data have indicated that traffic volumes start building on Thursdays during the summer months but peak on Fridays. This is documented further in Appendix A – "US 54 Expressway Traffic Study, Crawford Bunte Brammeier (CBB), 2002."

Currently, there are two signalized intersections in the study area: (1) at Business 54 and (2) at Route 42. These intersections were analyzed based on Chapter 9 of the Highway Capacity Manual and the results are indicated in Table 1-3.

Table 1-3. Existing Signalized Intersection LOS (2001)

Location	Saturday Midday Peak Hour		Friday P.M. Peak Hour	
	LOS	Delay*	LOS	Delay*
Route 54/Business 54	C	31.8	D	38.1
Route 54/Route 42	C	32.2	C	33.7

* Average Vehicular Delay in seconds per vehicle.

Source: CBB, *US 54 Expressway Traffic Study*, 2002.

Forecasted traffic volumes were computed using growth rate assumptions and the existing traffic volumes. The growth rate assumptions are documented further in the 2002 traffic study. The growth rate was carried out 20 years to the design year, 2021. These forecasted volumes were used to determine LOS on the existing facility as if no improvements were made (no-build alternative), and if a new expressway was developed in the study area (build alternative). At current rates of growth for traffic in this area, if no improvements are made to the existing system, LOS will deteriorate and delays will increase due to more traffic on existing Route 54 and on intersecting streets and entrances to major developments. Given the no-build alternative, the traffic is projected to grow at a rate of 1.5 percent per year. The growth rate increases to approximately 3 percent per year if an expressway is built. Under the no-build option, the LOS of the existing facility will degrade to level F along the entire route in the study area. Traffic volumes are estimated to range from a high of 58,700 average daily traffic (ADT) south of Route 42, to a low of 25,480 ADT north of Business 54 (Table 1-4).

Table 1-4. Existing and Projected Average Daily Traffic Volumes in the Study Area

Roadway Section	2001	2021 (No-Build)	2021 (Build)*
Route 54 – North of Business 54	19,200	25,480	32,760
Route 54 – Business 54 to Route 42†	40,800	57,400	37,380
Route 54 – South of Route 42**	43,400	58,700	43,540
Route 42 – East of Route 54	10,500	16,840	16,840
Business 54 – West of Route 54	24,300	34,050	40,175

* If constructed, a new expressway would attract 28,200 vehicles per day.

† Appendix A, Figures 17 and 18, Segment 1.

** Appendix A, Figures 17 and 18, Segment 2.

Source: CBB, *US 54 Expressway Traffic Study*, 2002.

The signalized intersections at Business 54 and at Route 42 were also evaluated for the design year conditions under both a no-build and a build condition. Table 1-5 provides the LOS for the no-build alternative and the build alternative.

Table 1-5. Signalized Intersection LOS (2021)

	Saturday Midday Peak Hour		Friday P.M. Peak Hour	
	LOS	Delay*	LOS	Delay*
No-Build Alternative				
Route 54/ Business 54	F	98.3	F	284.3
Route 54/ Route 42	F	149.8	F	209.0
Build Alternative				
Route 54/ Business 54	F	108.9	F	153.4
Route 54/ Route 42	E	76.1	F	149.8

* Average Vehicular Delay in seconds per vehicle.

Source: CBB, *US 54 Expressway Traffic Study*, 2002.

Table 1-5 supports the need to provide a new expressway in the study area, as the LOS will degrade to failure in the design year. If no action were taken, the existing facility would not meet the guidelines and principles for acceptable degrees of congestion in all sections of the route in the design year.

Additionally, Table 1-5 indicates that, even if an expressway were constructed, the levels of service at Business 54 and Route 42 would still be a level E or F. This supports an additional need to provide a higher type of access to and from the new expressway through the placement of interchanges at Business 54 and at or near Route 42. A more detailed analysis of the projected turning movements at these two intersections can be found in the 2002 traffic study.

1.5.2 Improve Safety

Accident statistics and safety data summarized or presented in this EA are protected under federal law (Appendix D).

According to historical accident data from January 1996 to December 2000, there are two intersections along the roadway within the study area that are identified as high accident locations. Those locations are as follows:

- Intersection of Route 54 with Business 54; and
- Intersection of Route 54 with Route 42.

Additionally, the intersections at Mace Road and Stonecrest Mall contribute to the overall accident rate on Route 54. The existing accident rate on this section of Route 54 is 493.27 accidents per hundred million vehicle miles traveled (HMVMT). This is over twice the statewide average (231 accidents per HMVMT) for this type of facility.

Recent data indicates that the predominant type of accidents throughout the study area were either rear-end or left-turn collisions. The highest percentage of these accidents in a single year was in 1998 when 69.6 percent of the 92 total accidents were rear end or left-turn collisions. The lowest percentage occurred in 1999 when 55.1 percent of 118 total accidents were rear-end or left-turn collisions. No other type of accident was predominant. Typically, rear-end or left-turn accidents result from higher volumes of traffic that are slowing or stopping due to access problems or congestion.

Weather conditions and time of day at which accidents occur are also an important consideration in determining the cause of accidents and the need for roadway improvements. An analysis of the 5-year accident data indicates that the vast majority of accidents on the existing route occur during the daytime (84.3 percent) and under dry conditions (72.4 percent). This again indicates that congestion attributes significantly to safety concerns on the existing roadway.

Given the seasonal commuting nature of the traffic in the lake region, further analysis was conducted to determine the percentage of accidents occurring during the peak summer months. An analysis of the 5-year accident data indicates that nearly 36 percent of the accidents occur between May 25 and September 7 (the approximate dates of Memorial Day and Labor Day weekends, respectively). If this time period is expanded to include the entire months of May and September, the percentage of yearly accidents rises to 55 percent. This indicates a slight increase in the accident rate during the heavier- traveled summer months.

Improvements to provide an alternate route are needed to improve system capacity and decrease accident potential for the traffic in the study area.

1.5.3 Route Continuity

Existing Route 54 is the primary north/south arterial through the Lake Ozark and Osage Beach areas. As mentioned earlier in this chapter, MoDOT has built, is building or is proposing other improvements to Route 54 in the Lake of the Ozarks region.

Immediately north of the study area, Route 54 is a four-lane expressway to just south of the Osage River. Construction on a new bridge over the Osage River began this year (2003), which will result in an extension of the four-lane expressway over the river (MoDOT Project J5P0649). Immediately south of the study area, MoDOT has planned a four-lane expressway on new location to the north end of the Grand Glaize Bridge over the Lake of the Ozarks (MoDOT Project J5P0309B). Construction on this section may not begin for a few years (depending on funding) but MoDOT has nearly completed design of this section and has already begun the process of acquiring right of way for the new expressway.

The portion of Route 54 on this project provides a 1.5-mile link between the two expressway sections to the north and south. Without this linkage, a 1.5-mile section of urban arterial would exist between two four-lane expressway sections.

Additionally, this section of Route 54 provides a regional connection to other sections of Route 54 through Jefferson City, Fulton, Bowling Green, Hermitage, and Nevada.



